

Prevalence of Solitary Thyroid Nodule in Patients Admitted in Hospital of Dera Ismail Khan, KPK, Pakistan

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ABSTRACT

Solitary nodules are a typical thyroid disease appearance. Solitary thyroid nodules are little swellings that are ordinarily impalpable glands. Solitary thyroid nodules are typically benign. With a mean age of 35 years, ladies are more likely than males to develop cancer (10–20%). An endocrine gland called the thyroid is located in the lower front and sides of the neck. Its primary purpose is to regulate basal metabolic rate. It also promotes somatic and psychic growth and is crucial for calcium metabolism. The identification, examination, and treatment of thyroid nodules can be difficult. These lumps frequently develop near the thyroid gland's border and are enormous in size, causing them to feel or seem like a lump in front of the neck. A multitude of variables, including age, sex, food, iodine deficiency, and even therapeutic and ambient radiation exposure, affect the occurrence of these nodules in a given population. This study was conducted in hospital of Dera Ismail Khan, KPK, Pakistan to determine the prevalence of solitary thyroid nodules in patients admitted in the hospital. The results indicate that females between the ages of 26 and 30 are more likely to have thyroid nodules. Swelling at the front of the lower neck is the most frequent presenting ailment. The majority of patients presented between 6 months and 3 years after the edoema first appeared. The sensitivity and specificity of FNAC in the current investigation were 92% and 98%, respectively, while sensitivity and specificity of USG were 70 and 90%, respectively. Histopathology verified all malignant tumours on FNAC, demonstrating its superiority. USG and FNAC aids in proper management planning as a result, preventing the need for additional surgery.

Keywords: Solitary thyroid nodule; Thyroid neoplasm; Neck swelling; Body mass index; Pakistan

INTRODUCTION

Thyroid nodules (TNs) are one of the endocrine system's prevalent disorders with a palpable incidence of 3-7% (Awad et al., 2016; Vanderpump, 2019; Sun et al., 2020). The identification, assessment, and treatment of thyroid nodules can be difficult. These abnormal growths/lumps frequently grow large and form around the thyroid gland's border, causing them to feel or seem like a lump in front of the neck (Vanderpump, 2011; Ogbera and Kuku, 2011; Feng et al., 2017).

A multitude of variables, including age, sex, food, iodine deficiency, and even therapeutic and ambient radiation exposure, affect the occurrence of these nodules in a given population. Spontaneous nodules develop at a rate of 0 to 0.8% each year, beginning early in life and continuing into the eighth decade, and prevalence rises with age. In clinical practice, thyroid nodules are diagnosed more frequently. Thyroid nodules are highly prevalent among the general population as a result of the rising detection rate of tiny and asymptomatic thyroid nodules by various imaging techniques (Keh et al., 2015; Sreekumar et al., 2020). The prevalence of TN previously stated 50% when the nodules were detected by ultrasound and/or other radiologic techniques (Chen et al., 2013, 2021).

The prevalence of thyroid nodules was 29.49% in men and 33.15% in women of China. The main chronic disorders affecting the health of peoples include diabetes, hypertension, metabolic diseases (hyperlipidemia, hyperuricemia, fatty liver, obesity) (Guo et al., 2014; Gibbons et al., 2008; Song et al., 2018; Sun et al., 2020). Thyroid disorders are significantly related with these metabolic diseases, according to prior research, however the findings are inconsistent. The present research work was planned to determine the prevalence of solitary thyroid nodule in females residing in 13th largest city (Dera Ismail Khan), KPK, Pakistan.

MATERIAL AND METHOD

A cross-sectional and prospective study was conducted in district Headquarter (DHQ) of Dera Ismail Khan, KPK, Pakistan from July 2020 to July 2021 to evaluate the prevalence, various clinical manifestations of solitary thyroid nodules and determine the most appropriate diagnostic approach for such a lesion. Total 1232 participants were involved in this study and among the total 394

were found patients of thyroid nodules (TNs). The prevalence of infected participants were recorded and further use in the analysis.

RESULTS AND DISCUSSION

The development of thyroid nodules has been linked to a number of variables, including gender, age, thyroid-stimulating hormone (TSH), and iodine intake. Numerous studies have also linked thyroid nodules to adiposity, which is often measured using body mass index (BMI). While some studies, especially those involving women, have shown a relationship between BMI and risk of thyroid nodules, other studies, including our own work with children, have not been able to find this connection. The basal metabolic rate and thermogenesis are closely regulated by thyroid hormones (Shin et al., 2016; Zou et al., 2020). Thyroid hormones have been linked to a number of markers of an unfavourable metabolic profile, as demonstrated in earlier research, even when they are within normal ranges. According to several authors, the metabolic syndrome (MetS) and its associated factors—obesity, insulin resistance (IR), hypertension, dyslipidemia, and impaired glucose metabolism—are linked to morphological thyroid abnormalities and may increase thyroid volume and nodule prevalence. The literature indicates that STN is more likely to develop into a cancer than many nodules. Due to this, surgeons frequently view them with a high level of suspicion (Kir et al., 2018).

Table 1: Age and sex wise distribution of participants.

Sex	Age (Year)						Total
	15-20	21-25	26-30	31-35	36-40	> 40	
Male	98	81	104	113	81	65	542
Female	133	134	119	118	103	83	690
Total	231	215	223	231	184	148	1232

Table 2: Age and wise distribution of patients.

Age	Male		Female	
	N	%	N	%
15-20	38	21.59	44	20.18
21-25	33	18.75	53	24.31
26-30	41	23.29	49	22.47
31-35	29	16.47	32	14.67
36-40	24	13.63	26	11.92
> 40	11	6.25	14	6.42

Total	176	100	218	100
Overall prevalence (%)	14.28%		17.70%	

In this study total 1232 participants were involved. Among the total, 542 and 690 were male and females, respectively (Table 1). The age wise data showed that highest prevalence of TNs was recorded in 26-30 year old patients while lowest in > 40 year old patients (Table 2).

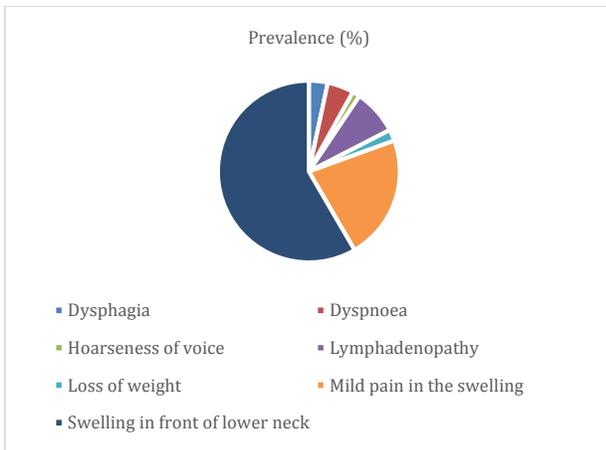


Figure 1: Distribution of patients according to symptoms

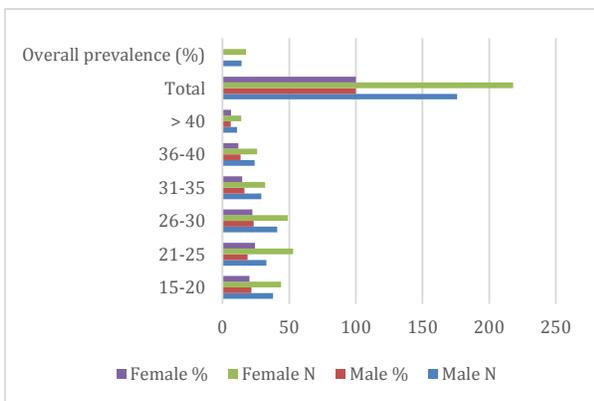


Figure 2: Comparison of the prevalence of TN in different age subgroup.

Table 3: Relation of drinking and smoking to the prevalence of thyroid nodules (TNs).

Parameters	Male	%	p-value	Female	%	p-value
Drinking						
Non-drinkers	141	35.78	0.127	178	45.17	0.009
Farmer drinkers	133	33.75		126	31.97	
Current drinkers	120	30.45		90	22.84	
Smoking	394					
Non-smokers	147	37.30	0.278	223	56.59	0.005
Farmer smokers	129	32.74		119	30.2	
Current smokers	118	29.94		52	13.19	

The prevalence of TNs was 35.78, 33.75, and 30.45% in non-smokers, former smokers, and non-smokers males, respectively while 45.17, 31.97, and 22.84% in females, respectively. There was no significant difference among the groups ($\chi^2 = 1.693$, $p = 0.127$) among both sexes was recorded (Table 3). In the study population, the prevalence of TNs was 17.7% (12.9% for men and 20.6% for women), with people with MetS [MetS(+)] having a considerably greater prevalence than those without MetS as reported by Feng et al. (2017).

Table 5: Characteristics of male and female with or without thyroid nodules.

Characteristics	Male			Female		
	Nodules +ve	Nodules -ve	p-value	Nodules +ve	Nodules -ve	p-value
BMI (kg/m ²)	23.13 ± 2.34	29.75 ± 4.59	0.02	24.15 ± 3.01	22.31 ± 3.43	0.03
SBP (mmHg)	128.10 ± 20.14	133.56 ± 21.04	< 0.001	130.04 ± 16.23	128.38 ± 11.40	< 0.001
TSH (mIU/L)	2.23 (1.51–3.65)	2.44 (1.82–4.53)	0.09	2.30 (1.64–3.69)	2.22 (1.42–3.31)	0.08
WC (cm)	81.54 ± 8.43	83.33 ± 10.65	< 0.001	83.43 ± 9.41	78.77 ± 8.79	< 0.001
DBP (mmHg)	79.12 ± 13.98	80.92 ± 13.87	0.007	82.43 ± 12.54	76.33 ± 11.64	0.008
UIC (µg/L)	223.1 (148.00–333.0)	227.0 (169.00–343.0)	0.164	226.0 (159.50–344.6)	221.0 (155.42–354.0)	0.161

The distribution of patients according to symptoms is shown in figure 1, while distribution of patients according to duration of symptoms is shown in figure 3. The prevalence rates of TNs were 21.59%, 18.75%, 23.29%, 16.47%, 13.63%, and 6.25% in 15-20, 21–25, 26–35, 36–40, and > 40 year-old, respectively as shown in figure 2. It was recorded that prevalence rates of TN enhanced significantly with increased in age. The Cochran–Armitage trend test was also statistically significant ($\chi^2 = 233.165$, and $p < 0.002$). The similar findings were recorded for both sexes ($p < 0.001$). Our current study results are almost similar to the outcomes of early studies conducted by many workers in the globe (Jiang et al., 2016; Bartolotta et al., 2006; Aghini-Lombardi et al., 1999). When compared to males, where the frequency of TNs was 14.28%, females had a substantially higher prevalence of 17.70%. The use of logistic regression demonstrated that the gender of the patient was a unique risk factor for the development of TNs. Previous studies have also shown that women are more prone than men to experience TNs (Kang et al., 2004; Yane et al., 1994).

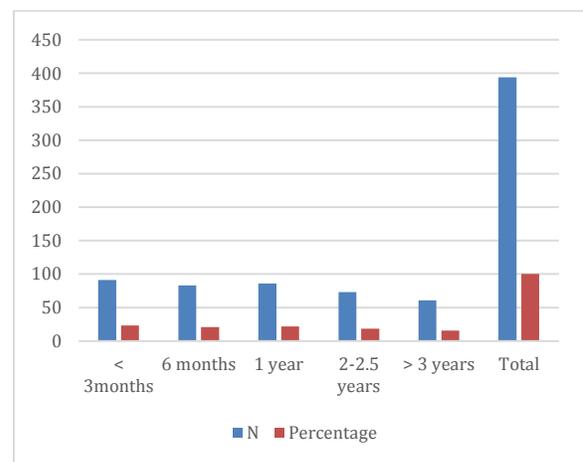


Figure 3: Distribution of patients according to duration of symptoms.

Mean BMI of male was 23.13 ± 2.34 and 29.75 ± 4.59 kg/m² for positive and negative nodules. Patients with TNs were significantly older than those without nodules and had significantly higher BMI while have significantly lower TSH (Table 5). Song et al. (2018) had reported the similar findings. They reported that 51.9% of the patients with thyroid nodules had a BMI under 24 kg/m², compared to 40.5% of the subjects without thyroid nodules (P = 0.003).

Table 6: USC and FNAC diagnosis in patients.

Classification	USG diagnosis	%	FNAC diagnosis	%
Suspicious	Suspicious MNG	3	Suspicious of malignant papillary neoplasm	4.31
	Suspicious mixed echogenic	19.28		
Benign	Hyperechoic nodule	29.18	Benign cystic lesion	28.68
	Cystic	28.17	Colloid nodule	36.29
Malignant	Hypoechoic	20.55	Anaplastic carcinoma	17
			Papillary carcinoma	13.7

In the current study, the USC diagnosis showed 3, and 19.28% of Suspicious MNG and Suspicious mixed echogenic, respectively while FNAC diagnosis showed 36.29 and 28.68% colloid nodule and benign cystic lesion, respectively (Table 6). Among the malignant lesions, 17 and 13.7% were anaplastic and papillary carcinoma respectively. The comparative analysis of specificity, sensitivity, NPV and PPV of FNAC and USG is shown in figure 4.

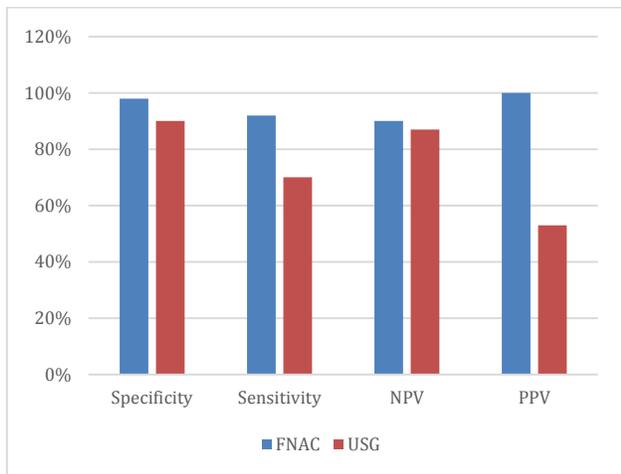


Figure 4: Comparative analysis of specificity, Sensitivity, NPV and PPV of FNAC and USG diagnosis

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